Heinz Wedewardt

Solarization and Posterizing

For many photographers the creative part of their work ends with the release of the shutter. Developing and enlarging are regarded as technical routines which in these days of high quality materials can be safely left to the laboratory staff.

However there are in fact great possibilities in the skilled use of laboratory techniques and it is with these that this article is concerned. Even the simple contact copying of a negative on to process film and direct enlargement from the resulting positive transparency can give striking effects, and if the same transparency is bound up emulsion to emulsion with the original negative very slightly out of register a relief effect is obtained. Depending on the precise nature of the displacement, white or black outlines are produced; these should be kept as narrow as possible, since wide fringes spoil the general effect. The best adjustment must be arrived at by trial. Even the slightest change in the displacement can give a completely different result. The most perfect relief is obtained when the density of the middle tones is the same in both negative and transparency, as this gives hard outlines against an almost uniform gray background. A soft transparency tends to give this uniform background only in the shadows, the middle tones and highlights retaining their original positive character. On the other hand a contrasty transparency results in a general reversal in the final print. The best material for making the transparency is a normal to contrasty process film. The gradation can be controlled within wide limits by greater or less dilution of the developer. The comparatively bright safelight which can be used with these process films enables the progress of development to be easily followed. The easiest way of binding up two films together is to use self-adhesive tape; it is quick and clean and is readily removable when required. The printing of a negative on process film is half way to solarization. The correct name for this is the "Sabattier Effect," and it is also known as 'pseudo-solarization,' but 'solarization' has by now become so generally used that I shall adhere to it in this article. The true solarization phenomenon results from a very high degree of over-exposure such as occurs when the image of the sun itself is included in a photograph. Once a certain critical exposure value is exceeded, the developable density commences to diminish. Thus in the example quoted the sun appears as a light disc on the negative. This effect is made practical use of in direct positive films, which are pre-fogged in manufacture to a point just short of the critical value.

For our 'pseudo-solarization' the Sabattier effect is utilized—named after its discoverer Armand Sabattier who in 1862 found that post-exposure of a developed film caused the light areas to darken, while the darker areas seemed to become lighter or retained their existing density depending upon the amount of the second exposure. Sabattier further observed as a special characteristic of the effect that where the densities of the first and second exposures met a white fringe occurred. The more contrasty the original negative, the more pronounced this line becomes. The mechanism of development is as follows: development of the silver bromide proceeds outwards from the centre of a white area, it spreads rapidly towards areas already darkened by the first development but is checked just before reaching them, leaving a white fringe. The effect is accentuated by keeping agitation of the developer to a minimum and using a short stop. On the relationship of first exposure, first development, fogging exposure, and second development the final result depends, and this must be determined by trial. As a guide, the original negative should be as contrasty as possible, printing exposure kept short, first development normal, fogging exposure 1—4 seconds (25 watts at 20 inches), and final development by inspection. After normal fixing, washing and drying the solarized negative can be enlarged as usual.

Should the density prove too great, it can be corrected with a reducer. The solarization technique is not confined to the negative; a positive can be treated in similar fashion. The procedure is the same in principle; short exposure on contrasty paper, first development, 2—6 seconds

All illustrations are by the author.

Posterized prints from colour negatives. The colour negative was treated in the same way as a black-and-white negative.

The technique of posterization is described in the text. Here four gradation steps were employed, and the picture is therefore built up from four clear cut half tones.

The same posterization as the one to the left, except that the individual tone separation negatives were exposed through a contact screen. (A single line screen, rotated through 90°, and a dot screen.)

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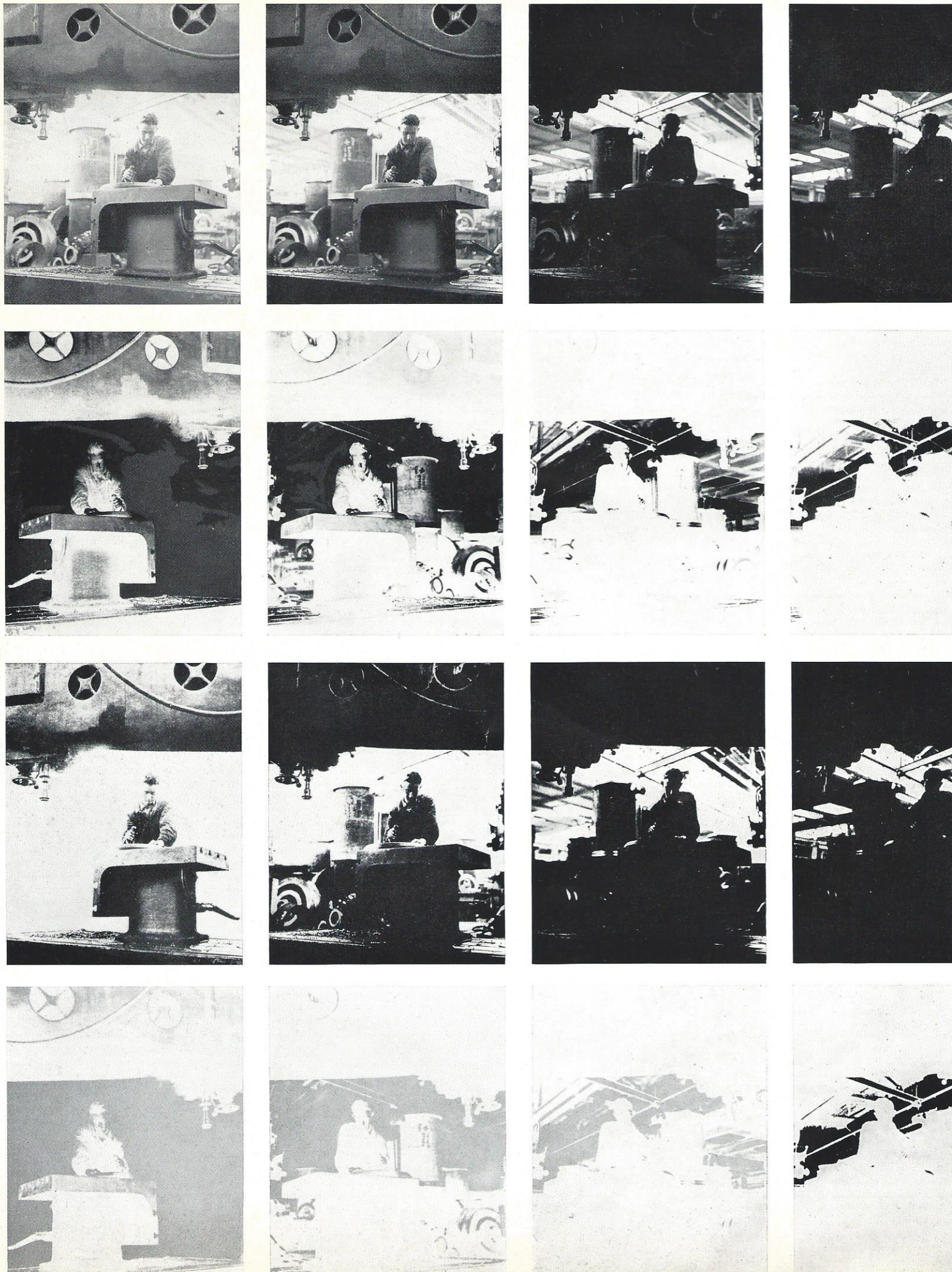
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fogging exposure, development by inspection. As a rule solarized positives are somewhat degraded, and the highlights must necessarily be cleared by reduction. Solarized positives, moreover, are of course in the form of single originals.

Solarized colour positives can give particularly exciting results. In this case the originally white areas are not left gray or black, but coloured, depending upon the filter used for the fogging exposure. The original colours for the most part remain; even quite faint colours frequently do not transmit the coloured fogging light but act to some extent as a protective filter.

A colour solarization is made as follows: the negative used should be as contrasty as possible, so that many completely clear areas will remain in the resulting positive to assume the solarization colour. The positive is printed with the normal filters and the paper immersed in the developer. After 5 minutes development the dish with the print in it is placed on the enlarger baseboard and the fogging exposure given through a filter or combination of filters, the negative having been previously removed from the enlarger negative holder. The most suitable colour filter and exposure time are determined by trial. (This can be greatly simplified by preparing a colour scale for the enlarger which enables the colour effect to be determined in advance.) After the fogging exposure development is continued, the development time being again decided by trial. The remaining processing then follows as usual. During the fogging exposure the developing solution must of course be clear and free from bubbles; it is therefore necessary first to allow the solution to become still, and if used developer is employed it is advisable first to filter it in order to remove any suspended precipitate, as this may mar the result during the fogging exposure. The possibilities afforded by the use of colour material in printing from black-and-white negatives are greatly widened by the employment of colour solarization techniques.

In days when the exposure latitude of negative emulsion was still somewhat inadequate various methods of tone separation were practised and it was then that the technique of 'posterizing' was developed. As films continued to improve in quality these techniques fell for a long time into disuse; with the development of modern advertising photography they are once again coming into their own. Posterizing, which lies on the fringe of photography and graphic art, is nevertheless a purely photographic technique. Its purpose is to split up the scale of continuous tones of the photograph into a series of separated, uniform tones which are clear cut one against another and do not merge. As formerly applied, the technique of posterizing aimed at achieving such a multiplicity of tone values as to approach in effect the original photograph, whilst at the same time correcting the gradation. The aim was to produce a tone separation into a great number of tone values from the highest lights, through the middle tones into the deepest shadows. Today the same end can be more successfully achieved with any ordinary negative material

Posterization from four gradation steps

Series 1: About 10 contact prints are made on extra hard paper from the original negatives, with varying exposures. From these, four are chosen such that between them they show all the most important groups of tones from the highest lights to the deepest shadows.

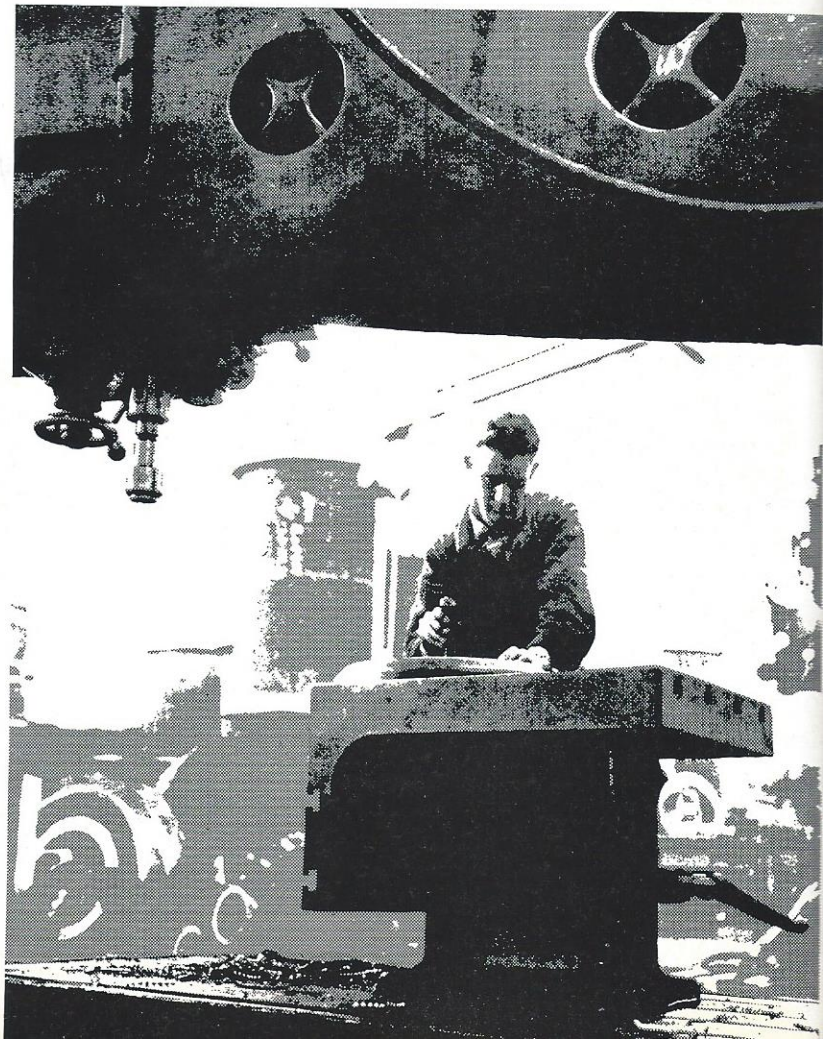
Series 2: From the paper prints of Series 1 contact prints are made, again on extra hard paper, but this time all with the same exposure.

Series 3: The paper negatives of Series 2 are contact printed on contrasty process film, giving transparencies comprising only black-and-white tones with sharply defined boundaries.

Series 4: The transparencies of series 3 are contact printed on thin process film. Development is so controlled as to give very transparent negatives. To ensure that the highlights remain perfectly clear in the final enlargement a high contrast process developer is used for developing the tone-separation negative 4/D. Superimposition of the set of tone-separation negatives of Series 4 gives the final posterized negative from which enlargements can be made.

Note on screen posterization

From the transparencies of Series 3 A and B were selected. 3A — bound up with a fine offset crossline contact screen — and 3B were contact printed on process material and developed to high contrast. The remaining procedure was as above.



and standard development appropriate to the material; in current practice tone separation is applied to quite different ends. Modern advertising usually demands accurate rendering: frequently, however, detailed realism is discarded, and a simpler presentation is sought. Here is where posterizing finds successful application. It is even possible by its means to achieve the extreme 'line' effect of just two flat tones of black and white by limiting the process to a single tone separation. (Suitable for newspaper advertisements.) Large posters can also be made in the same way. Procedure is first to obtain a fairly contrasty negative. From this prints are made on thin paper of extra hard contrast giving a series of different exposure. The effect of this is to resolve the image into different broad tone groups, many details being suppressed by the steep gradation in conjunction with full development. The lightest of these prints must just record the deepest shadows, the darkest prints reveal only the highest lights. From this series of perhaps ten prints these are selected at the most suitable bases for posterization (series 1). The number should be kept as low as possible but these few prints must between them show all important details. Two steps, or even one, may of course suffice if conception and original permit. However in most cases from three to five steps are needed to ensure that all important details are included. Registration marks, made on the negative before the first prints are made, will facilitate subsequent assembly. To this end either a cross may be scratched on the negative with a scriber, or notches may be cut in the edges of the negative previously dyed with neococcin; the latter course is preferable because the fine lines of the cross are often indecipherable in the dark steps. The work is much easier if large-format negatives are employed. It is essential that all prints be made the same way of the material. It is a well known fact that paper stretches when wet and shrinks on drying, but more in one direction than in another. To ensure uniform shrinkage the maker's imprint on the back of the paper must lie always in the same orientation when the print is made, otherwise when the elements are finally assembled registration errors will become unpleasantly obvious as a double image effect.

From the positive prints selected from the first procedure as above contact prints are now made on extra hard paper. This time the exposure is kept constant. The resulting paper negatives will show practically no half tones (series 2). Contact prints of these are then made on a contrasty process film, e. g. Agfa Printon K or Peruprint FO I. This yields transparencies with sharply defined highlights and shadows (series 3). Retouching can be carried out as needed with retouching dye on the transparencies and paper negatives obtained at the variuos stages of the procedure, and any specks due to the presence of dust particles during printing can easily be eliminated at the same time. When all necessary retouching on the transparencies is completed a further series of prints is made—still on high contrast process film—but this time a highly diluted (soft working) developer is used, e. g. Rodinal 1:100 or 1:200. The image must appear only slowly and development is stopped as soon as the desired density is reached. The individual partial negatives must be so soft, that when superimposed they do not exceed the density of a normal negative (series 4). These negatives are then dried in a dust-free room and mounted in register. The first negative, which should have about $^5/_8$ inch border, is attached with self adhesive tape to a sheet of opal glass illuminated from behind. The other negatives are then superimposed on this in succession and fixed by the edge with adhesive tape. With the help of the register marks this should present no difficulty. The resulting composite negative can now be enlarged by normal routine method.

As a special effect, tint or texture screen effects can easily be included in posterized pictures. The screens, which are obtainable from any supplier of graphic arts requisites, are attached to the separation at the second or third stage of the process and printed in with it. To obviate interference between screens, a line screen may, for example, be printed vertical on one separation and a similar screen printed horizontal on another. The final negative will then exhibit a cross ruling from the combination of the two screens. If in the final stage (series 4) full development is given, the resulting negative will give a pure black-and-white enlargement. Where the intention is to convert the continuous tone of the original completely into line and screen, it is essential to choose the correct positive separations for use in the later stages. These separations must contain all the important detail which it is desired to retain. It is at times unavoidable to make a number of prints, to enable a really close selection to be made.

Such posterized pictures, which are often in themselves surprisingly effective, can be combined with normal negatives and enlarged together with them. Even transparency separations can be used in this way. The two components—original negative and tone separation negative or positive—must be so made that no important detail is lost or masked. Especially adapted to this type of composite enlarging are negatives which show no detail except at a few points.

Procedure: The text was written in photo-opaque on a sheet of Ultraphan, which then was laid on the bromide paper while the enlargement was made; it could of course equally well have been reproduced photographically instead of by hand. In both cases the text appears white on the enlargement. If positive, black, text, is required the original text must be contact printed on to Printon film. Positive text can of course be inserted only on to light areas of the picture, and must be added to the enlargement by a separate printing.

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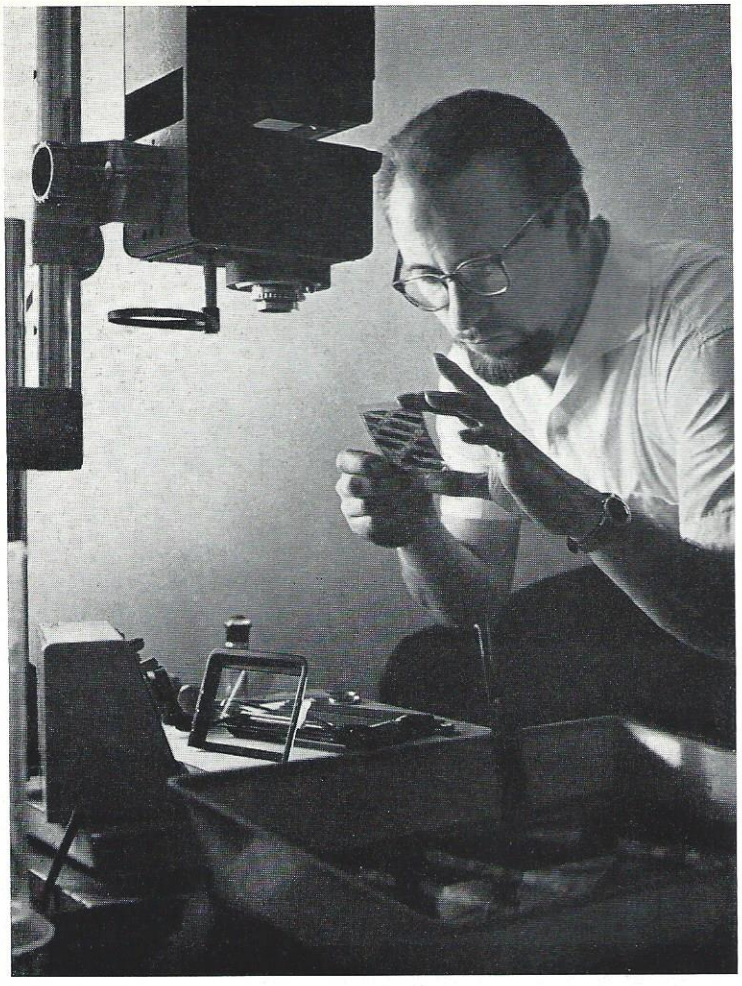

The author of the article, Heinz Wedewardt, in his laboratory.

A particularly effective posterization of an engine room. Three gradation steps were used, each with a screen interposed. Two positive line screens were used, parallel with the edges of the picture. A negative line screen was used diagonally.